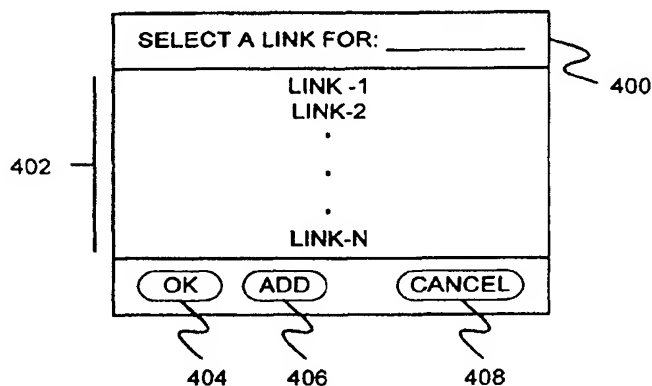




## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<b>(51) International Patent Classification <sup>7</sup> :</b> <b>G06F 17/30</b>	<b>A1</b>	<b>(11) International Publication Number:</b> <b>WO 00/07133</b> <b>(43) International Publication Date:</b> 10 February 2000 (10.02.00)
<b>(21) International Application Number:</b> PCT/US99/16007 <b>(22) International Filing Date:</b> 14 July 1999 (14.07.99)  <b>(30) Priority Data:</b> 09/124,463      28 July 1998 (28.07.98)      US  <b>(71) Applicant:</b> ADOBE SYSTEMS INCORPORATED [US/US]; 345 Park Avenue, San Jose, CA 95110-2704 (US).  <b>(72) Inventor:</b> PASQUA, Joseph; 530 Morey Drive, Menlo Park, CA 94025 (US).  <b>(74) Agent:</b> GOREN, David, J.; Fish & Richardson P.C., Suite 100, 2200 Sand Hill Road, Menlo Park, CA 94025 (US).		<b>(81) Designated States:</b> JP, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).  <b>Published</b> <i>With international search report.</i>

**(54) Title:** METHOD AND SYSTEM FOR APPLYING USER SPECIFIED HYPERLINKS



**(57) Abstract**

A computer-implemented method of choosing a hyperlink for an electronic document in which an electronic document and a first input are received at a client computer. The first input selects a portion of the electronic document, and a selected text is derived from the portion. A plurality of suggested hyperlinks are generated by using the selected text to perform a first search, e.g., of a document link table or a local link table. A choice of one of the suggested hyperlinks is received to select a chosen hyperlink. To generate the plurality of suggested hyperlinks, the selected text and affinity information about the user may be used to perform a second search at a server computer, and the selected text and contextual information about the selected text may be used to perform a third search on a network. The chosen hyperlink may be added to the electronic document as an object that can be activated when the selected portion is selected in a hyperlink navigation application.

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**METHOD AND SYSTEM FOR APPLYING USER SPECIFIED HYPERLINKS****BACKGROUND**

Hypertext technology allows an author to reference one  
5 point in a document to another point in the same document or  
an entirely different document through the mechanism of a  
hyperlink or, more simply, a link. Links can be associated  
with any item displayed and selectable within a document, such  
as text, graphics or images. Electronically, links are often  
10 displayed in some distinguishing manner such as by underlining  
text with which the link is associated. A reader viewing a  
hypertext document that has links can jump to a hyperlinked  
document or a different part of the same document (the  
"target" of a link) by selecting the text or a hot spot  
15 associated with a link. Selection may be accomplished through  
a graphical user interface using a mouse or other pointing  
device or through keyboard commands in a textual interface, or  
potentially using voice commands.

Drawbacks to conventional hyperlink systems include  
20 the incomplete and/or inconsistent assignment of links by the  
author. For example, if an author does not provide a link for  
a word or phrase, a subsequent viewer/reader of the document  
cannot reference another location through that word or phrase.  
Similarly, if the author linked only some instances of a word  
25 or phrase and not other instances of the same word or phrase,  
those words or phrases not explicitly linked cannot be used as  
links. Finally, because an author may associate different  
links with a single word or phrase, depending upon the  
context, it can be difficult for a reader to recall with what  
30 links a given word or phrase have been associated.

It would be beneficial to provide a user (a human  
being using a computer or computing device) with an automated  
mechanism to define new links and to recall prior links based

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on document context and the user's preferences. It would also be beneficial to provide these same capabilities to groups of authors so that they may effectively collaborate during the generation of hypertext documents.

5

## SUMMARY

In general, in one aspect, the invention features a computer-implemented method of choosing a hyperlink for an electronic document. In the method, an electronic document and a first input are received at a client computer. The first input selects a portion of the electronic document, and a selected text is derived from the portion. A plurality of suggested hyperlinks are generated by using the selected text to perform a first search, and a choice of one of the suggested hyperlinks is received to select a chosen hyperlink.

Implementations of the invention may include the following. The first input may be generated as a result of a computer-executed script, or it may be entered by a user. The first search may be performed at the client computer. A document link table associated with the electronic document or a local link table may be searched. The choice may be derived from a second input entered by the user. An interface for browsing the suggested hyperlinks may be provided, and the target document of one of the suggested hyperlinks may be displayed for the user to evaluate. The plurality of suggested hyperlinks may be generated by performing a second search at a server computer. The suggested hyperlinks may be returned to the user in an order based on prior evaluations of items, e.g., hypertext documents accessible on a network, by the user and the similarity of the user's evaluations to other users' evaluations of at least one of the items. A list ranking the suggested hyperlinks may be generated based on a second input may be entered by the user indicating the user's order of preference for the suggested hyperlinks. The list ranking the suggested hyperlinks may be stored at the server computer for subsequent use in choosing hyperlinks. The

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selected text and additional contextual information may be used to search documents accessible on a network of computers. The contextual information may be derived from text close to the selected text in the electronic document. A third user  
5 input may be received to identify a piece of the electronic document from which the contextual information is derived, and keywords may be extracted from the identified piece of the electronic document. A hyperlink may be added to the  
10 portion of the electronic document. The chosen hyperlink and the association may be stored in a link table separate from the electronic document.

In general, in another aspect, the invention is directed to a computer program, tangibly stored on a  
15 computer-readable medium. The computer program's instructions cause a computer to receive an electronic document, receive a first input that selects a portion of the electronic document, derive a selected text from the portion, generate a plurality of suggested hyperlinks by using the selected text to perform  
20 a first search, and receive a choice of one of the suggested hyperlinks to select a chosen hyperlink.

The first input may be entered by a user and the choice may be based on a second input entered by the user. The chosen hyperlink may be stored with the selected portion  
25 as an object that can be activated when the selected portion is selected when viewing the electronic document in an application supporting hyperlink navigation. The first search may be performed at a client computer and the plurality of suggested hyperlinks may be generated by performing a second  
30 search at a server computer. The computer may navigate to the target of the chosen hyperlink.

In general, in another aspect, the invention is directed to a computer program, tangibly stored on a computer-readable medium. The computer program's instructions  
35 cause a computer to display an electronic document to a user, receive a command from the user that selects an area of the

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electronic document associated with a plurality of hyperlinks, select one of the plurality of associated hyperlinks as the chosen hyperlink, and navigate to the target of the chosen hyperlink.

- 5           The input may be a selection of one of a plurality of buttons associated with a pointing device. The input may include clicking a button associated with a pointing device more than two times.

- In general, in another aspect, the invention is  
10 directed to a computer-implemented method of choosing a hyperlink for an electronic document. In the method, an electronic document is displayed to a user at a client computer, a first input that selects a portion of the electronic document is received at the client computer, and a  
15 selected text is derived from the portion. A plurality of suggested hyperlinks are generated by using the selected text to perform a first search at the client computer, by using the selected text and affinity information about the user to perform a second search at a server computer, and by using the  
20 selected text and contextual information about the selected text to perform a third search on a network. A second input is received at the client computer to select one of the suggested hyperlinks as a chosen hyperlink, and the client computer navigates to the target of the chosen hyperlink.

25                           BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a block diagram of a computer system having client and server units interconnected through a network.

FIG. 2 is a link table.

- FIG. 3A through FIG. 3C is a flowchart of client-side  
30 hyperlink collaboration processing.

FIG. 4 is a link selection dialog interface.

FIG. 5 is a link ranking dialog interface.

FIG. 6 is a diagram of a link search process.

- FIG. 7 is a diagram of link server side hyperlink  
35 collaboration processing.

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FIG. 8 is a transaction table.

FIG. 9 and FIG. 10 are flowcharts of another aspect of server side hyperlink collaboration processing.

#### DETAILED DESCRIPTION

5 Referring to FIG. 1, an illustrative computer system 100 for designating and applying user specified hyperlinks to a document includes one or more clients (e.g., client-1 102 and client-2 104) and a link server 106 connected through a network 108. Clients 102 and 104 can be personal  
10 computers or computer workstations. Link server 106 can be a personal computer, a computer workstation, a minicomputer, or a mainframe computer. Network 108 can employ any interconnection technology and can include a business or private intranet as well as the Internet.

15 As used herein, the term "client" refers to a computer system or process that requests a service of another computer system or process. A "server" is the computer system or process that provides the requested service. No specific architecture or communication protocol is presumed or implied  
20 by the use of these terms. In particular, while clients 102 and 104 and link server 106 are shown as separate units in computer system 100, a client process (or client) and a server process (or server) can execute from a common hardware platform. Further, the term "document" is intended to  
25 encompass any computer-readable file that contains text, images, graphics, or other items displayed and selectable.

Referring to FIG. 2, text in a document may be associated with a hyperlink (hereinafter links) by way of link table 200. Each entry 202 in link table 200 includes a text  
30 (such as a word or phrase) 204, and a list of one or more links 206 associated with that text. A link may refer to another document, another location within the same document, or a universal resource locator (URL).

Link table 200 can be a document link table, local  
35 link table, or global link table. Document and local link

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tables may be located on a client machine (e.g., 102 and 104) or file server (e.g., 106) that is accessible by the client machine. Global link tables are located on a server.

Document link tables can keep lists of links that are either  
5 in a document to begin with or assigned in the document by the client using a mechanism described below. Local link tables can be thought of as a cache of pre-specified links stored at the client computer, analogous to a dictionary. A user can have different local link tables for different subjects.  
10 Global link tables provide a mechanism for collaboration because they are located on a link server which is accessible to a number of clients. In one implementation, link table 200 is represented as a B-tree, where each node in the B-tree has a key representing text 204, and a value representing links  
15 206 associated with the key's text.

Designation and application of user-specified hyperlinks by means of computer system 100 can be logically divided into client side and server side operations. Client side operations are performed by a client (e.g., 102 and/or  
20 104) and include user interaction and local processing. Server side operations are performed by link server 106 and can include use of database, natural language analysis, and affinity group or statistical correlation technology.

Referring to FIG. 3, a client side session begins when  
25 a user opens a document (step 300). If the document has a previously generated document link table (the 'yes' prong of step 302), it is opened (step 304) and processing continues when the user selects a text such as a word or phrase for linking (step 306).

30 If the document does not have a previously generated document link table (the 'no' prong of step 302), a document link table is created (step 310). A document link table is created by examining (i.e., scanning or parsing) the document for any previously-defined links.

35 A document link table can be created each time a document is opened (e.g., step 310), or it can be generated



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once and stored in memory for repeated use. Multiple users of the same document each can have their own unique document link table. If stored in memory, the document link table can be updated, such as when a new hyperlink is associated with text  
5 by the user.

A benefit of generating a document link table is that if a document's author explicitly links only a single instance, or only some instances, of a particular word or phrase (or any string of text), all subsequent uses of that  
10 word or phrase may be treated as a hyperlink automatically. Further, if an author associates different links with different instances of the same word or phrase, instances of that word or phrase not explicitly linked by the author can automatically be associated with one or more of the links.

15 The process of navigating to the targets of these different links upon selection of text not explicitly linked can be automated, for example, based on the method of selection. In one embodiment, a right mouse-click selecting text not explicitly linked navigates to one target, while a  
20 left mouse click navigates to an alternative target. Thus, different links can be invoked from the same instance of a word or phrase according to what act selected the word or phrase.

At some point the user selects the text he wants to  
25 use to link to another document, a URL, or another location in the same document (step 306). If the selected text is an author-specified link (the 'yes' prong of step 312), the link is followed (step 314) to complete the client-side transaction (step 316).

30 If the selected text is not associated with an author-defined link (the 'no' prong of step 312), the document link table is consulted (if one exists) to obtain a set of links for the text (the set may contain zero, one, or more than one link). If the text has one link associated with it  
35 in the document link table (the 'yes' prong of step 318), the link is followed (step 314) to complete the client-side

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transaction (step 316).

If the document link table has more than one link associated with the selected text, the list of associated links is presented to the user. As shown in FIG. 4, this can  
5 be done with a dialog box 400. The user may accept one of the displayed links 402 (link-1, link-2, . . . , link-N) by selecting it and activating 'OK' button 404. Alternatively, the user can add another link to the document specific link table by activating 'ADD' button 406 and entering the link  
10 when prompted. If the user declines all of the offered links 402 and does not add a new link, he can activate 'CANCEL' button 408 to return to viewing the document.

If the selected text is not in the document link table or the document link table does not exist (the 'no' prong of  
15 step 318), a local link table can be consulted (if one exists) to determine if the selected text has an associated link.

If the selected text is in the local link table (the 'yes' prong of step 320), the link is followed (step 314) to complete the client-side transaction (step 316). If the local  
20 link table has more than one link associated with the selected text, the user may select, reject, or add a link as described above and in FIG. 4. If the selected text is not in the local link table (the 'no' prong of step 320), the selected text and a user identification are transmitted to link server 106 (step  
25 322), which also may be referred to as a collaborative server. Link server 106 processes the received information (see discussion below and FIG. 7 through 10) and returns a (possibly empty) list of links to the client (step 324).

If the link server supplied list is not empty (the  
30 'no' prong of step 326), the list is presented to the user (step 328) as described above in reference to FIG. 4. If the user requests a search after viewing the list (the 'yes' prong of step 330), or if the link server supplied list is empty (the 'yes' prong of step 326), a user search is performed  
35 (step 332). A search operation (step 332) is described below and in reference to FIG. 6. The results of the search are

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displayed to the user who can then select a link (step 334) as described above, and/or rank the links in the list according to his preference. The selected link can be added to the document link table (if one exists) and/or the local link  
5 table and/or the global link table at step 336, and the selected link is followed (step 314) (i.e., the browser or other software displaying the electronic document navigates to the link's target and displays it) to complete the transaction (step 318). Alternatively or in addition to adding the  
10 selected link to the document link table, the link can be added directly to a copy of the electronic document (such as the copy cached at the client computer during the client-side process).

If the link server supplied list is not empty (the  
15 'no' prong of step 326) and the user does not request a search (the 'no' prong of step 330), the user may elect to rank the individual links (e.g., in order of relevance). If the user elects to rank the list of links (the 'yes' prong of step 338), an interface is provided that gives the user the ability  
20 to view the list of provided links, select a link, and reorder the selected link relative to the other links (step 344). Such a graphical user interface 500, which displays a list of links 502, is shown in FIG. 5. The user can select a link by, for example, "single clicking" on it. The selected link can  
25 then be reordered by activating 'UP' 504 and 'DOWN' 506 buttons. When done, the user can activate the 'OK' button 508 to complete the ranking operation or can cancel the ranking operation by activating the 'CANCEL' button 510. It is advantageous to provide the user with an interface that allows  
30 traversing a selected link prior to its ranking (i.e., displaying the target document). For example, the user can "double click" on a link to invoke a standard world wide web browser application or other browser. This feature facilitates an evaluation of a link so that it can be ranked  
35 more accurately. The list of ranked links is sent to the link server along with the user's transaction identifier (step

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346). Once the highest ranked link is added to the document link table (step 348), if one exists, the current client-side transaction is complete (step 316).

If the user does not choose to rank the list of links (the 'no' prong of step 338), he may simply select a link (step 340). The selected link is sent, along with a transaction identification, to link server 106 (step 342). The selected link is incorporated into the document link table (if one exists) at step 336 and the selected link is followed (step 314) to complete the transaction (step 318).

Referring to FIG. 6, a user search (step 332) is initiated when the user selects a word or phrase for linking and a block of text (e.g., any number of words before, after, or surrounding the selected word or phrase) to be analyzed (step 600) to provide context for the search. Text selection can be performed by using a pointer device (e.g., a mouse) to highlight the desired text and then issuing a search command through a key command or menu selection. Alternatively, the text can be selected by a computer process, such as a script, without direction from the user. The specified text is converted into a list of key words, by a contextual analysis application, for example (step 602), formatted into a syntactically correct query (step 604), and submitted to a search engine (step 606). The search engine can, for example, be a standard world wide web based search engine or a user-supplied word-link database. The search engine returns a (possibly empty) list of links which are displayed to the user (step 608) who can review, select, add, or decline the offered links (step 610) as described above and in FIG. 4. It is beneficial to provide a mechanism for the user to browse the offered links so that he may determine which link is most appropriate. For example, a standard world wide web browser may be invoked when the user "double clicks" one of the displayed links. The selected link and transaction identification are transmitted to link server 106 (step 612) and processing continues at step 336.

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Generation of key words (step 602) can be accomplished by contextual analysis of the text selected in step 600. Contextual analysis can employ natural language processing technology in combination with techniques such as stem, synonyms, sounds-like, fuzzy-match, and proximity searches. One tool for the contextual analysis of text is the ConText Option for the Oracle Universal Database, produced by Oracle Corporation of Redwood Shores, California. Context Option v1.2 uses natural language processing technology to identify themes and discourse in text.

Referring to FIG. 7, a server side session at a link server is initiated when a client sends (see step 322 in FIG. 3) a unique user identification and selected text to link server 106 (step 700). Server 106 creates a transaction table entry (step 702). Referring to FIG. 8, a transaction table 800 includes one entry 802 for each active client request. Each entry 802 includes a unique transaction identifier 804, the user-specific user identification 806 sent from the client, a time-stamp 808 indicating when the transaction record was created, the selection 810 (i.e., text) sent to the server from the client, and a result field 812 which is initially empty. Transaction record 802 uniquely identifies a client request with a user. Time-stamp 808 is used to remove transaction records (client requests) from transaction table 800 after a specified time.

Once a transaction record has been created, a server link table is interrogated to determine if the client supplied selection 810 has an associated link (step 704). The server link table can be a global link table or a link table available to a specific user, document, client, or server. The result of the link table search is placed in result 812. The result can be a pointer to a (possibly empty) list of links. If the server finds zero or one link associated with client selection 810 (the 'no' prong of step 706), transaction identifier 804 and result 812 is returned to the client (step 710) to complete the server side handling of a client's request

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to process a user selection (step 712).

If the server finds two or more links associated with client selection 810 (the 'yes' prong of step 706), the links are ordered in accordance with the user's preferences (step 5 708) and the transaction identifier and result list is sent back to the client (step 710) to complete the server transaction (step 712). If the user has no preferences (e.g., a new user), any links identified by server 106 are returned in a default (e.g., alphabetical) order. One link ordering 10 technique relies on affinity group analysis, or affinity processing, which uses previously-collected information of how a user ranked certain items (such as links or Web sites) and the similarity of the user's ranking/preferences to other users'. This information is used to make suggestions to a 15 user for future sampling of items. Affinity group analysis is also known as collaborative filtering, and is described generally in, for example, U.S. Pat. No. 4,870,579.

Referring to FIG. 9, when the user selects a link or ranks a list of links, the server receives this information 20 along with the user transaction identifier (step 900). If the transaction identifier is in the transaction table (the 'yes' prong of step 902), each link is added to the appropriate link table or recorded for later use as described in FIG. 10 (step 904). Once the client process is notified that the server's 25 link table(s) and/or databases have been updated (step 906), the client requested transaction is complete (step 908).

If the transaction identifier is not present in the transaction table (the 'no' prong of step 902), the transaction has timed out. A transaction times out if the 30 time difference (indicated by time stamp 808) between when the client first requested an action and the current time exceeds a specified threshold.

Each link or list of links can be used to update server link tables and/or user affinity databases as shown in 35 FIG. 10 (step 904). First, the transaction identifier is used to specify the link or list of links which will be used to

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update server tables (step 1000). If the client-supplied link is in the transaction record's result list 812 (the 'yes' prong of step 1002), the link is marked with the user supplied ranking (step 1004). If the client-supplied link is not in  
5 the transaction record's result list (the 'no' prong of step 1002), the link is added to the server link table (step 1006). In addition to adding links to one or more server link tables, user-supplied link rankings are recorded for use in affinity processing (collaborative filtering) as described above.

10 The foregoing description is illustrative only and is not to be considered limiting. Various changes in the components as well as in the details of the illustrated operational methods are possible without departing from the scope of the claims. For example, the described client-side  
15 operations can be implemented as a stand-alone application, or incorporated into existing applications (e.g., word processing, authoring tools, and hypertext browsers) using standard computer program "plug-in" techniques. Further, link tables can be stored in nonvolatile memory (e.g., a hard disk  
20 or CD-ROM), or in a cache memory for improved retrieval efficiency.

Implementations of the invention have been described which allow a user to associate links with selected text in an existing document. The invention can also be implemented to  
25 allow an author to insert links in a document he is composing. In this way the author can consistently link text in a document. Furthermore, multiple authors working on a single document may collaborate by using document (and author group) specific link tables to create and use a consistent set of  
30 links for the document. In a system that operates in a fashion similar to that of an automatic spell checker in word processing programs, a word or phrase is checked, as it is entered in the document, against the document's link table (local or global). If a match is found, the user is notified  
35 (e.g., by a pop-up dialog box or an audible cue) and can then select, decline, or modify the proffered link(s). If a link

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is selected, the word is converted into a hyperlink format in accordance with the document's format (e.g., HTML or PDF syntax).

In addition, user search and ranking operations can be performed by either a client process or a server process, or a combination of the two. For example, text selection and search query format can be done by a client process while contextual analysis of selected text can be performed by a server process, or by an application invoked by a server.

10 The invention can be implemented in digital electronic circuitry, or in computer hardware, firmware, software, or in combinations of them. Apparatus of the invention can be implemented in a computer program product tangibly embodied in a machine-readable storage device for execution by a  
15 programmable processor; and method steps of the invention can be performed by a programmable processor executing a program of instructions to perform functions of the invention by operating on input data and generating output. The invention can advantageously be implemented in one or more computer  
20 programs that are executable on a programmable system including at least one programmable processor coupled to receive data and instructions from, and to transmit data and instructions to, a data storage system, at least one input device, and at least one output device. Each computer program  
25 can be implemented in a high-level procedural or object-oriented programming language, or in assembly or machine language if desired; and in any case, the language can be a compiled or interpreted language. Suitable processors include, by way of example, both general and special purpose  
30 microprocessors. Generally, a processor will receive instructions and data from a read-only memory and/or a random access memory. Storage devices suitable for tangibly embodying computer program instructions and data include all forms of non-volatile memory, including by way of example  
35 semiconductor memory devices, such as EPROM, EEPROM, and flash memory devices; magnetic disks such as internal hard disks and



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removable disks; magneto-optical disks; and CD-ROM disks. Any of the foregoing can be supplemented by, or incorporated in, ASICs (application-specific integrated circuits).

To provide for interaction with a user, the invention  
5 can be implemented on a computer system having a display device such as a monitor or LCD screen for displaying information to the user and a keyboard and a pointing device such as a mouse or a trackball by which the user can provide input to the computer system. The computer system can be  
10 programmed to provide a graphical user interface through which computer programs interact with users.

The invention has been described in terms of particular embodiments. Other embodiments are within the scope of the following claims.

15 What is claimed is:

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1. A computer-implemented method of choosing a hyperlink for an electronic document, comprising:
  - receiving at a client computer an electronic document;
  - receiving at the client computer a first input that
  - 5 selects a portion of the electronic document and deriving from the portion a selected text;
  - generating a plurality of suggested hyperlinks by using the selected text to perform a first search; and
  - receiving a choice of one of the suggested hyperlinks to
  - 10 select a chosen hyperlink.
2. The method of claim 1, wherein the first input is entered by a user.
3. The method of claim 1, wherein the first input is generated as a result of a computer-executed script.
- 15 4. The method of claim 1, wherein the first search is performed at the client computer.
5. The method of claim 1, wherein performing the first search comprises searching a document link table associated with the electronic document.
- 20 6. The method of claim 1, wherein performing the first search comprises searching a local link table.
7. The method of claim 2, wherein the choice is derived from a second input entered by the user.

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8. The method of claim 7, further comprising:  
providing an interface for browsing the suggested  
hyperlinks; and  
displaying the target document of one of the suggested  
5 hyperlinks for the user to evaluate.

9. The method of claim 2, wherein generating the  
plurality of suggested hyperlinks further comprises performing  
a second search at a server computer.

10. The method of claim 9, wherein the suggested  
10 hyperlinks are returned to the user in an order based on prior  
evaluations of items by the user and the similarity of the  
user's evaluations to other users' evaluations of at least one  
of the items.

11. The method of claim 10, wherein the items evaluated  
15 are hypertext documents accessible on a network.

12. The method of claim 10, further comprising:  
based on a second input entered by the user indicating  
the user's order of preference for the suggested hyperlinks,  
generating a list ranking the suggested hyperlinks; and  
20 storing the list ranking the suggested hyperlinks at the  
server computer for subsequent use in choosing hyperlinks.

13. The method of claim 9, wherein performing the second  
search comprises using the selected text and additional  
contextual information to search documents accessible on a  
25 network of computers.

14. The method of claim 13, wherein the contextual  
information is derived from text close to the selected text in  
the electronic document.

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15. The method of claim 13, further comprising:  
receiving a third user input to identify a piece of the  
electronic document from which the contextual information is  
derived; and  
5 extracting keywords from the identified piece of the  
electronic document.
16. The method of claim 1, further comprising:  
adding the chosen hyperlink to the electronic document as  
a link associated with the selected portion of the electronic  
10 document
17. The method of claim 16, wherein the chosen hyperlink  
and the association are stored in a link table separate from  
the electronic document.
18. A computer program, tangibly stored on a  
15 computer-readable medium, comprising instructions for causing  
a computer to:  
receive an electronic document;  
receive a first input that selects a portion of the  
electronic document and derive from the portion a selected  
20 text;  
generate a plurality of suggested hyperlinks by using the  
selected text to perform a first search; and  
receive a choice of one of the suggested hyperlinks to  
select a chosen hyperlink.
- 25 19. The computer program of claim 18, wherein the first  
input is entered by a user and the choice is based on a second  
input entered by the user.

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20. The computer program of claim 18, further comprising instructions for causing the computer to store the chosen hyperlink with the selected portion, the chosen hyperlink being stored as an object that can be activated when the selected portion is selected when viewing the electronic document in an application supporting hyperlink navigation.

21. The computer program of claim 18, wherein the first search is performed at a client computer and the plurality of suggested hyperlinks are generated further by performing a second search at a server computer.

22. The computer program of claim 18, further comprising instructions for causing the computer to navigate to the target of the chosen hyperlink.

23. A computer program, tangibly stored on a computer-readable medium, comprising instructions for causing a computer to:

display an electronic document to a user;  
receive an input from the user that selects an area of the electronic document associated with a plurality of hyperlinks;  
select one of the plurality of associated hyperlinks as the chosen hyperlink; and  
navigate to the target of the chosen hyperlink.

24. The computer program of claim 23, wherein the input comprises a selection of one of a plurality of buttons associated with a pointing device and the input is used to select the chosen hyperlink.

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25. The computer program of claim 23, wherein the input comprises clicking a button associated with a pointing device more than two times.

26. The computer program of claim 23, further comprising  
5 instructions for causing a computer to:

select the chosen hyperlink based on prior evaluations of items by the user and the similarity of the user's evaluations to other users' evaluations of at least one of the items.

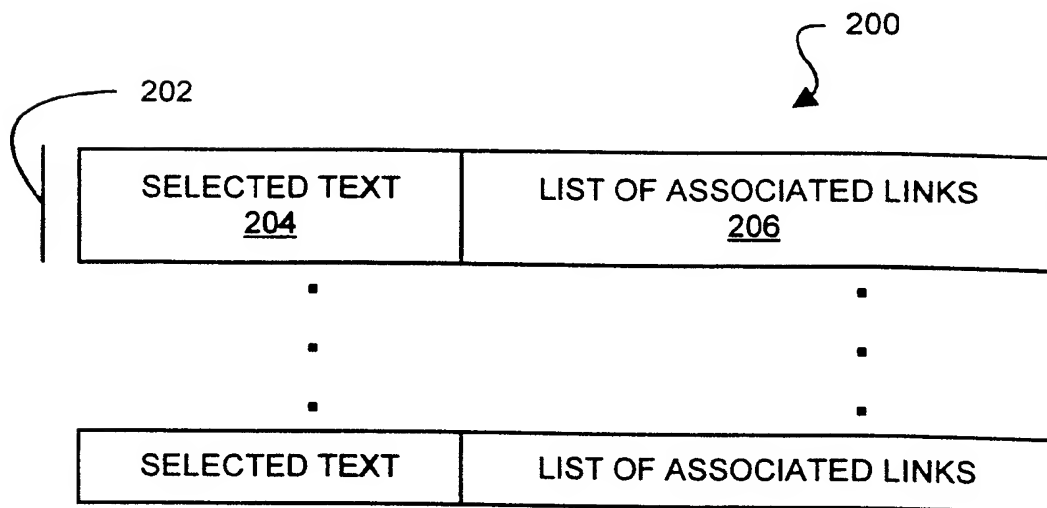
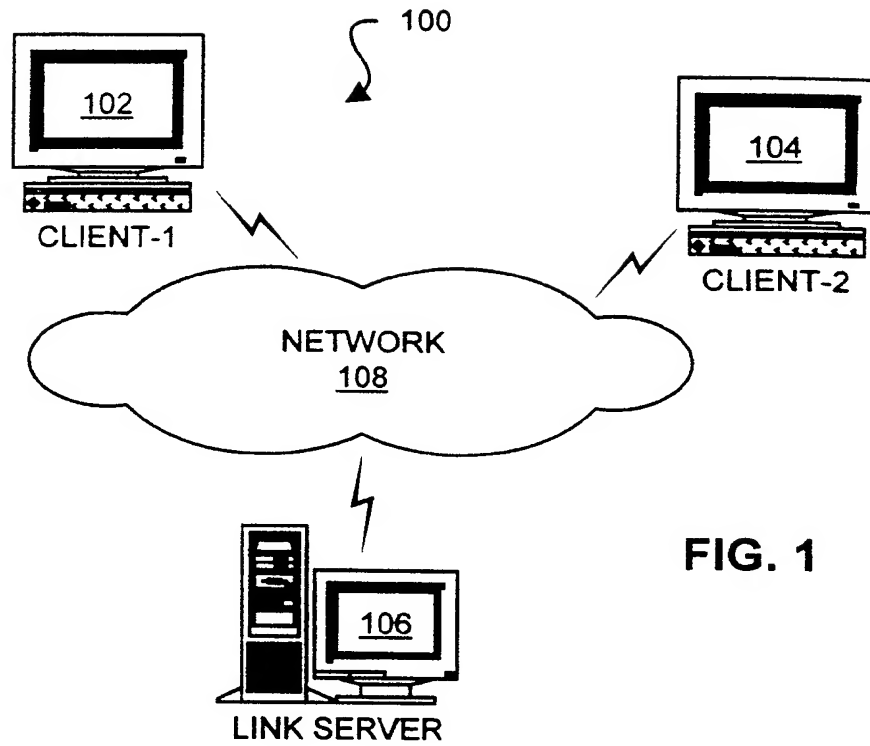
27. A computer-implemented method of choosing a  
10 hyperlink for an electronic document, comprising:

displaying at a client computer an electronic document to a user;

receiving at the client computer a first input that selects a portion of the electronic document and deriving from  
15 the portion a selected text;

generating a plurality of suggested hyperlinks by using the selected text to perform a first search at the client computer, by using the selected text and affinity information about the user to perform a second search at a server  
20 computer, and by using the selected text and contextual information about the selected text to perform a third search on a network;

receiving at the client computer a second input to select one of the suggested hyperlinks as a chosen hyperlink; and  
25 navigating to the target of the chosen hyperlink.



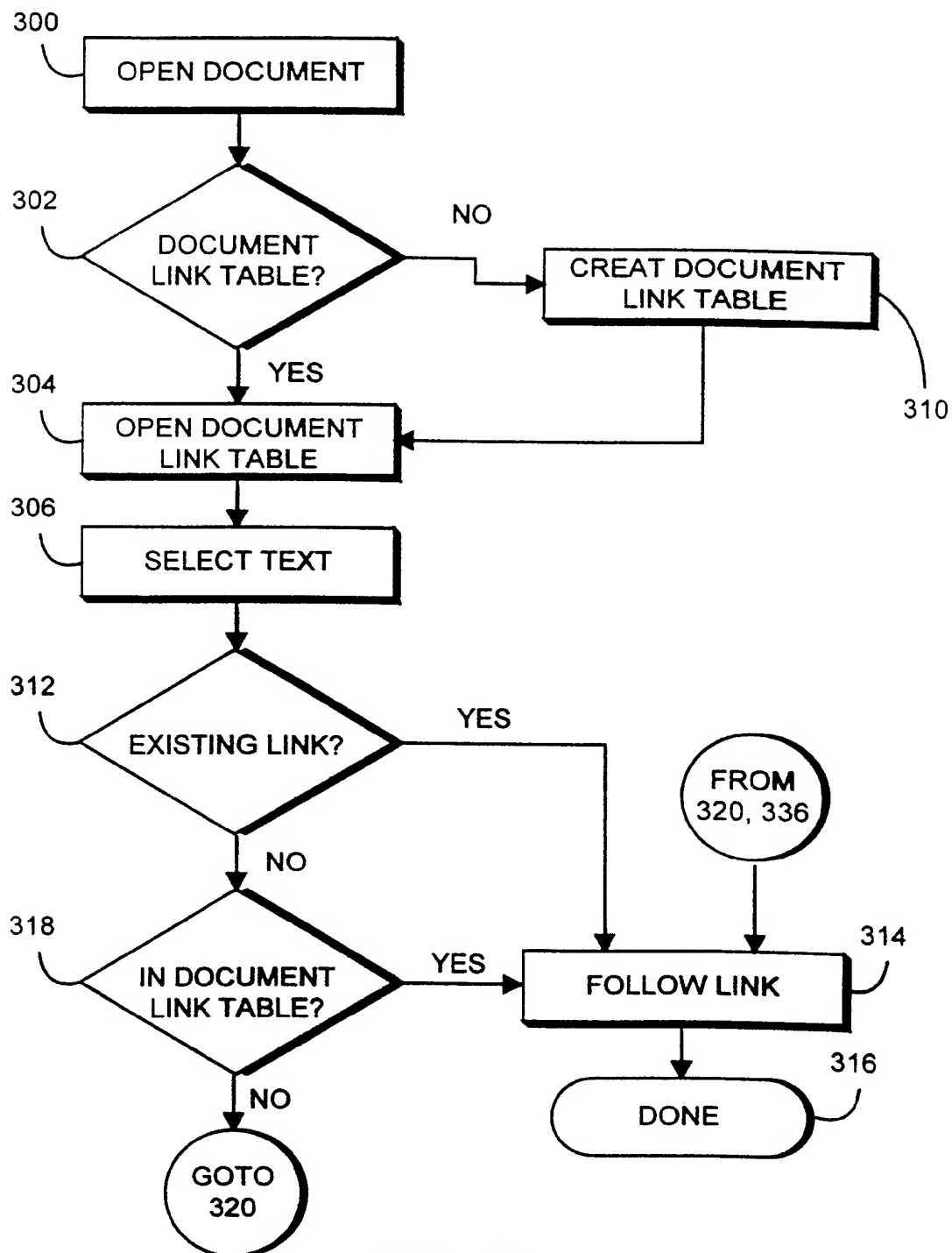
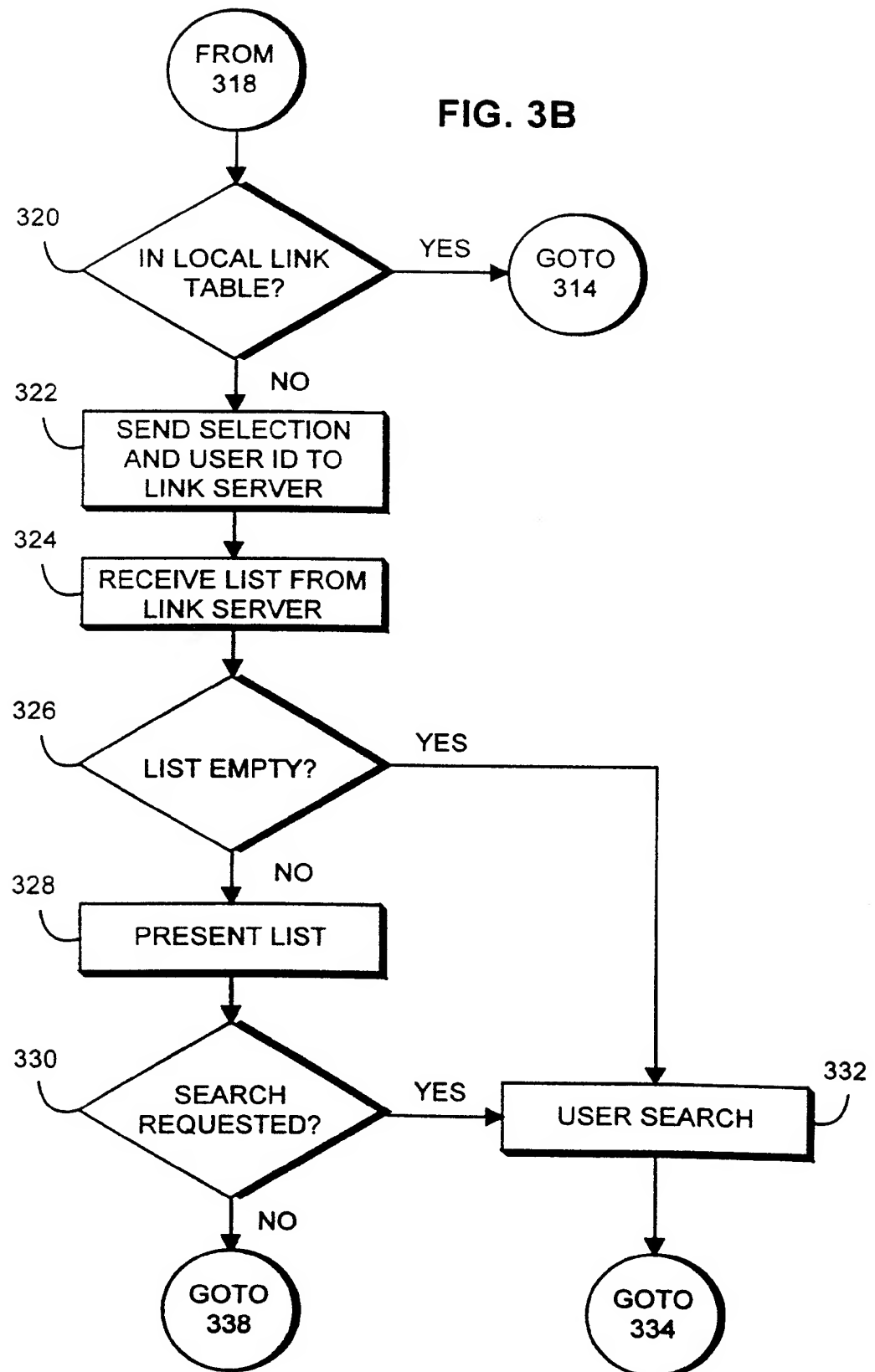
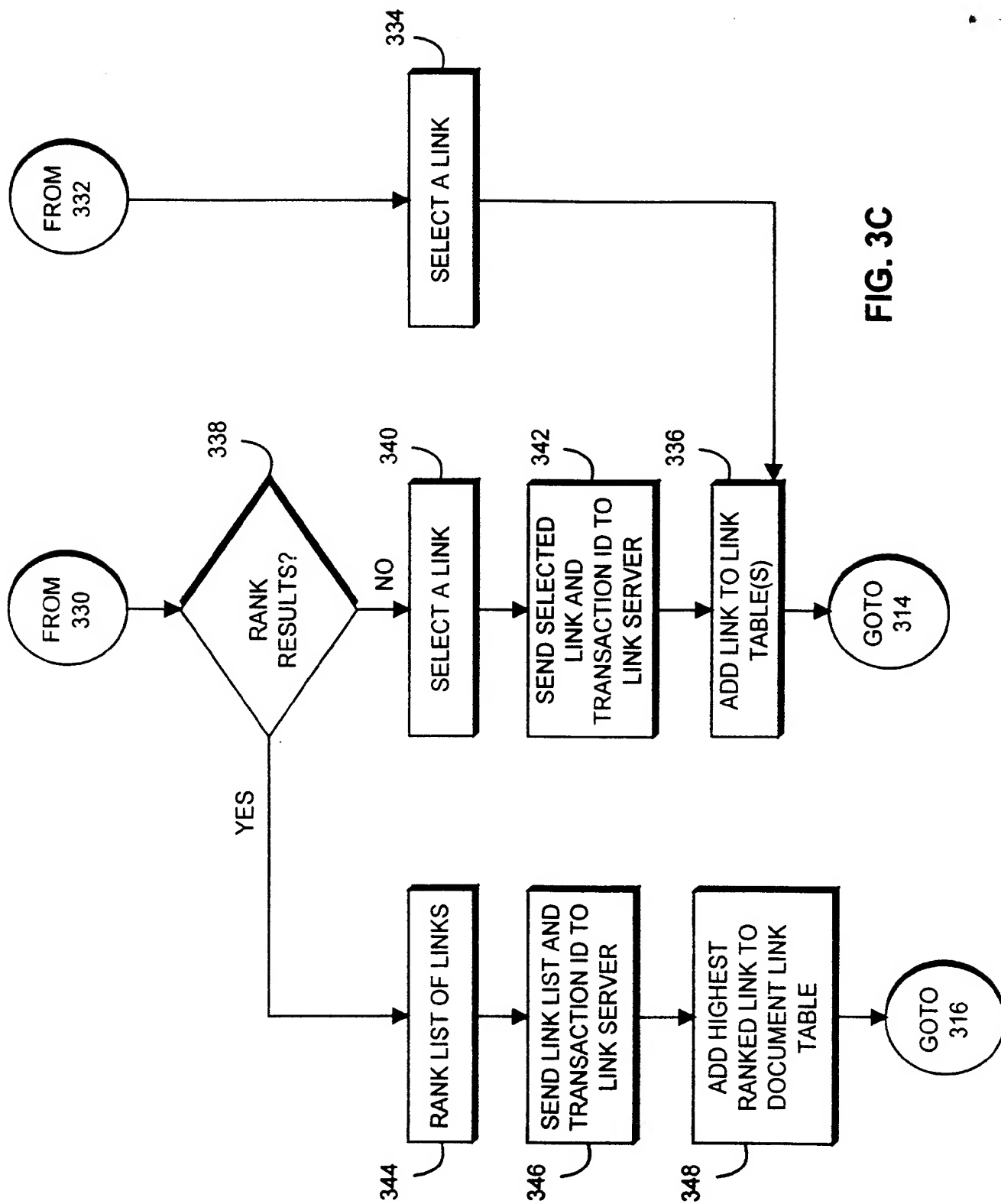


FIG. 3A



FIG. 3B





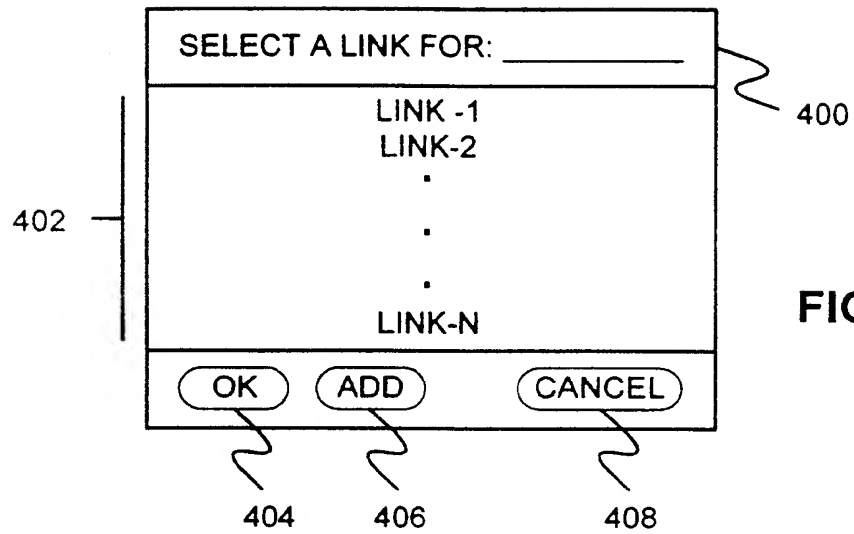


FIG. 4

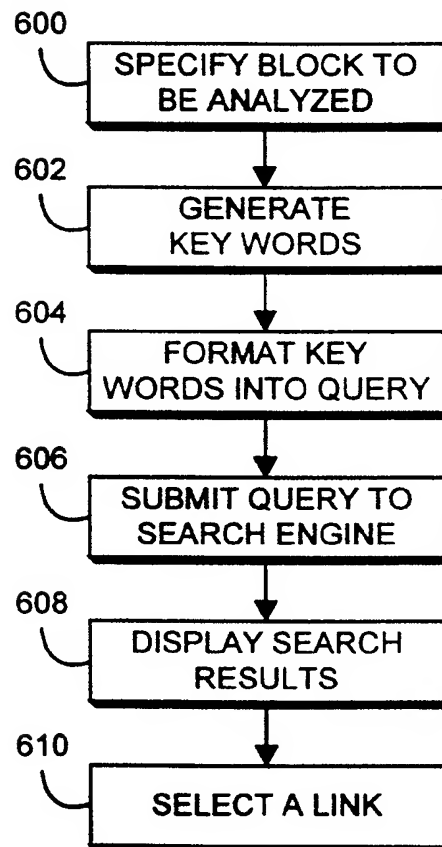
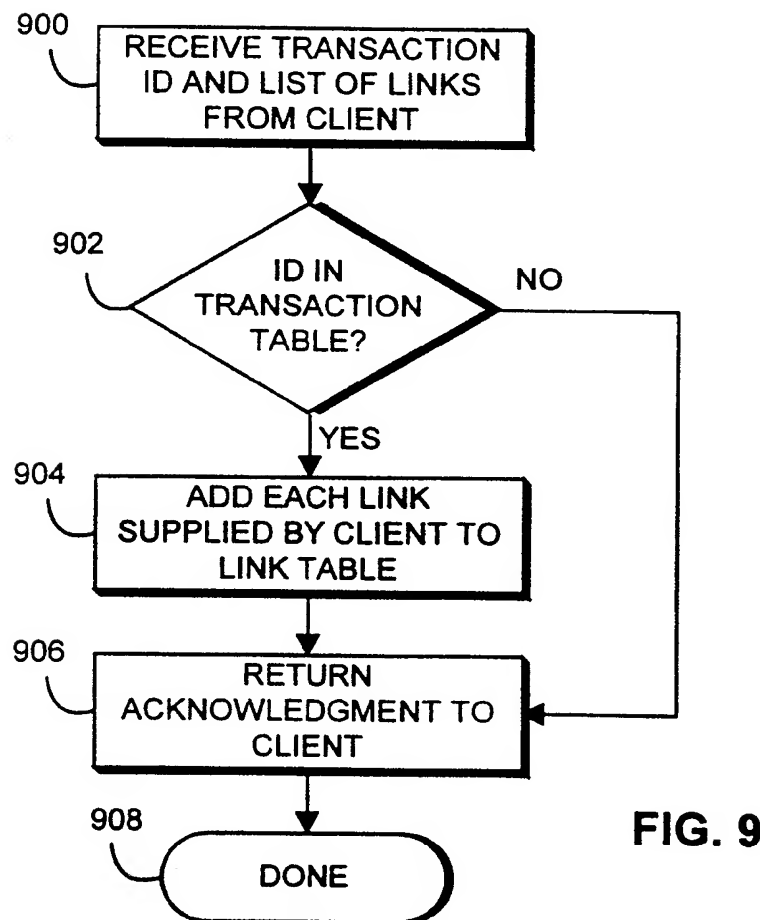
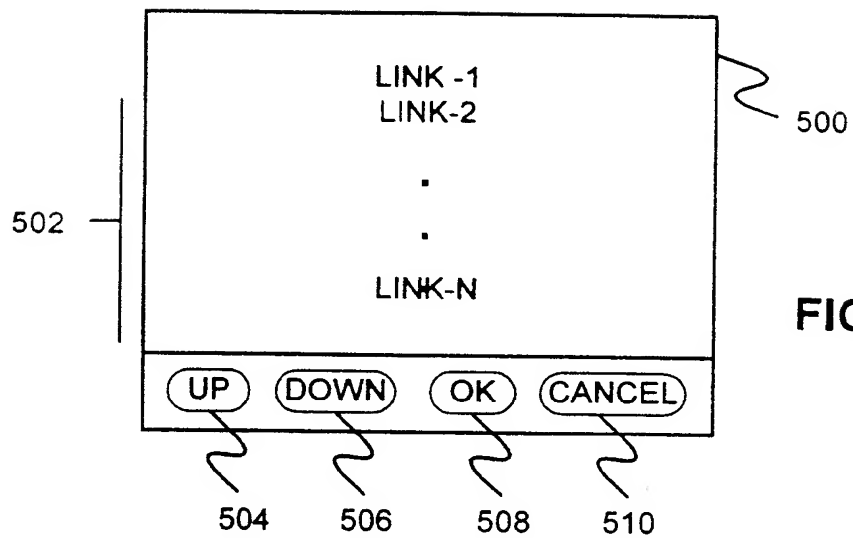


FIG. 6



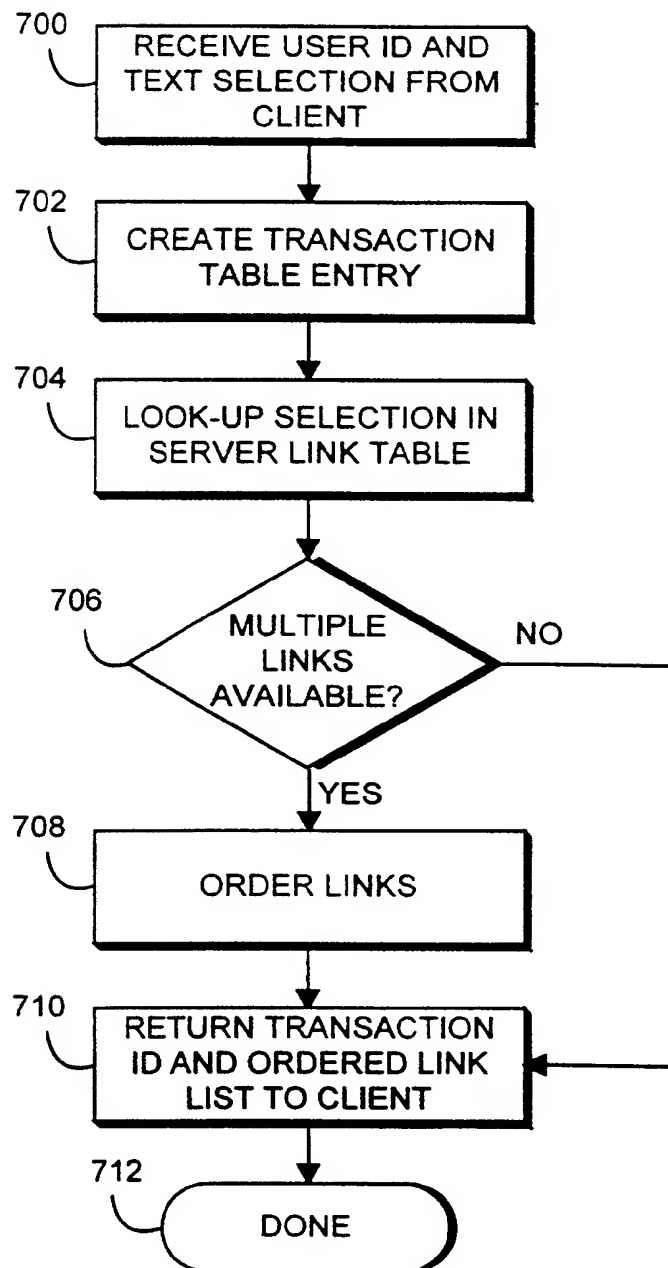


FIG. 7

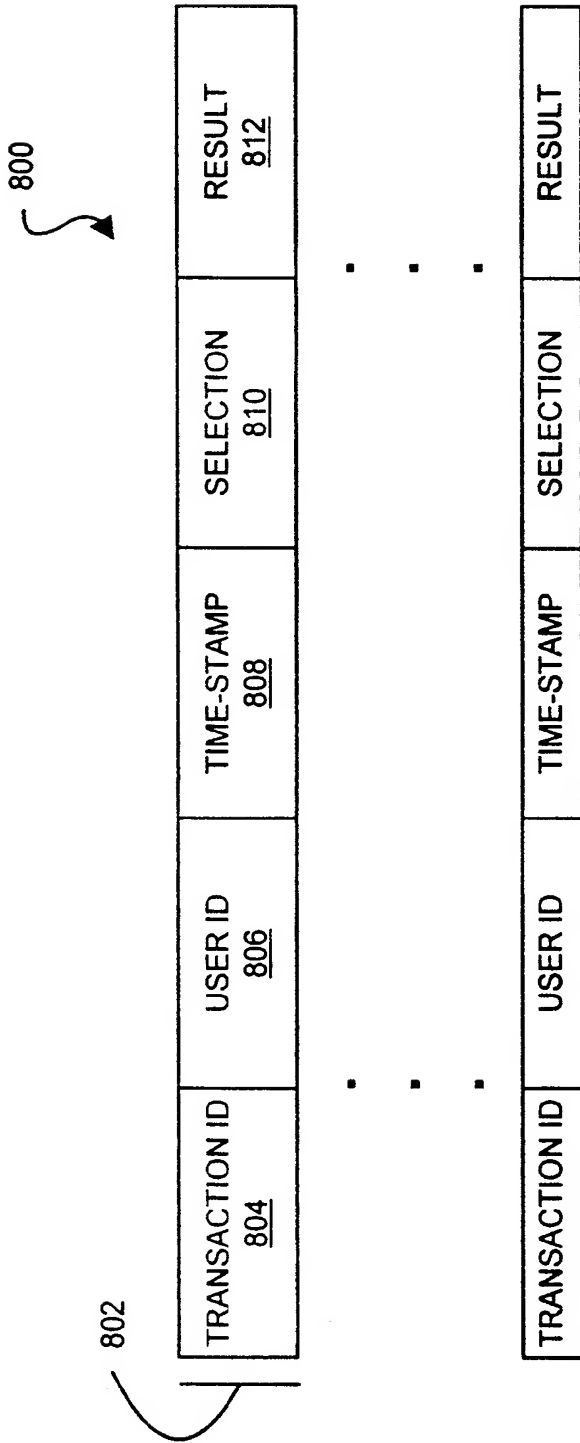


FIG. 8

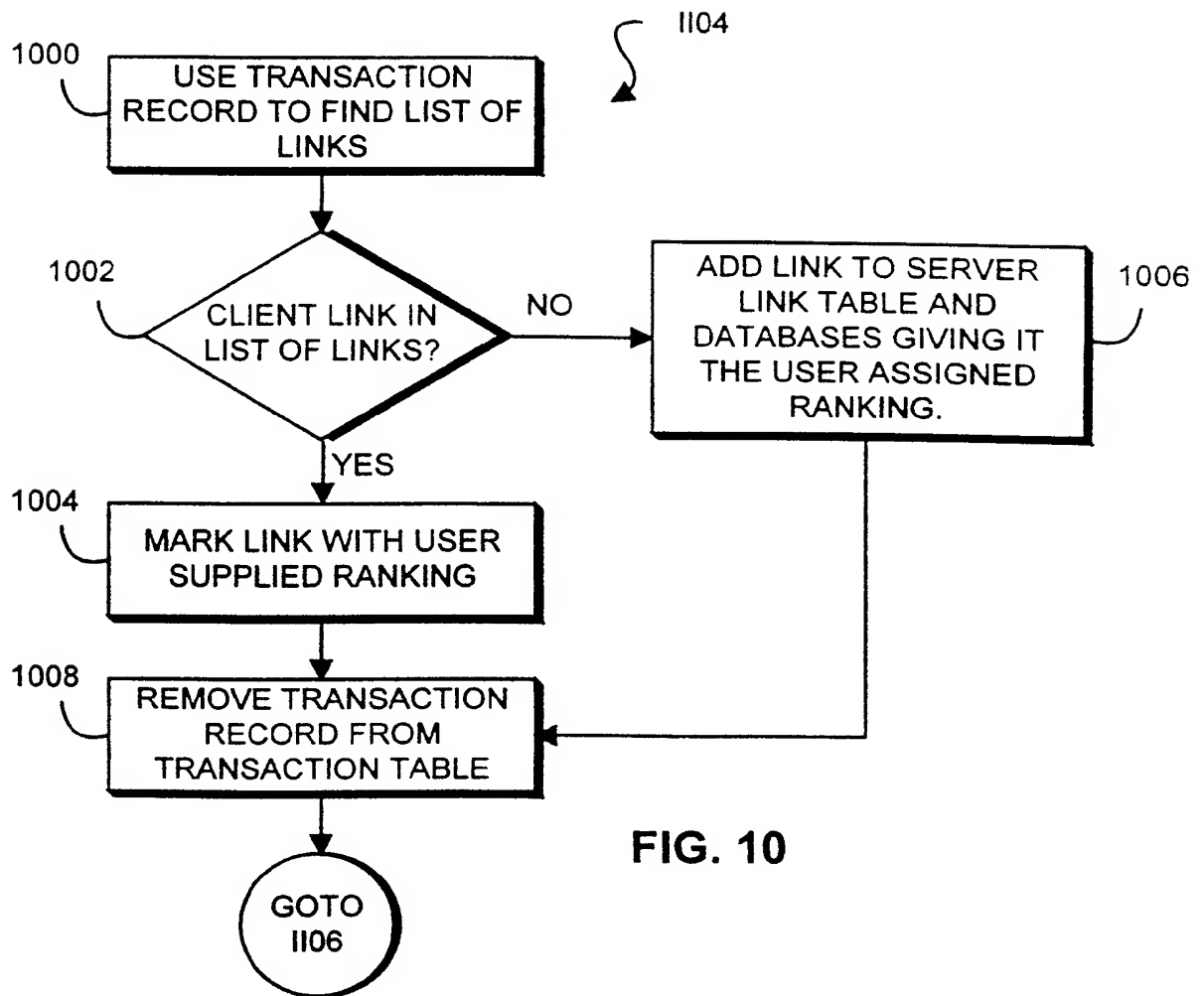


FIG. 10

## INTERNATIONAL SEARCH REPORT

International Application No.

PCT/US 99/16007

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 G06F17/30

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	HALL W: "ENDING THE TYRANNY OF THE BUTTON" IEEE MULTIMEDIA, US, IEEE COMPUTER SOCIETY, vol. 1, no. 1, page 60-68 XP000440889 ISSN: 1070-986X	1-8, 16-20, 22, 23
A	page 64, right-hand column, line 6 -page 68, left-hand column, line 7 --- -/--	27

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

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"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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Date of the actual completion of the international search

15 November 1999

Date of mailing of the international search report

23/11/1999

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# INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 99/16007

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	QIAN Q ET AL: "ABSTRACTION AND INHERITANCE OF HYPERLINKS IN AN OBJECT-ORIENTED HYPERTEXT DATABASE SYSTEM TEXTLINK/GEM" IEICE TRANSACTIONS ON INFORMATION AND SYSTEMS, JP, INSTITUTE OF ELECTRONICS INFORMATION AND COMM. ENG. TOKYO, vol. E78-D, no. 11, page 1343-1352 XP000553521 ISSN: 0916-8532	1, 2, 4, 7, 8, 18, 19, 22-24
A	page 1345, right-hand column, paragraph 4 -page 1349, left-hand column, paragraph 6; figures 1-5	27
A	GB 2 312 975 A (MICROSOFT CORP) 12 November 1997 (1997-11-12) page 5, line 18 -page 11, line 15 page 19, line 21 - line 25	1, 9, 18, 21, 23, 27
A	US 5 446 891 A (KAPLAN CRAIG A ET AL) 29 August 1995 (1995-08-29)  abstract; claims 1, 2, 6	1, 2, 4-10, 12, 13, 18-23, 27

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 99/16007

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
GB 2312975 A	12-11-1997	CN 1175035 A DE 19718834 A FR 2748362 A JP 10124531 A	04-03-1998 13-11-1997 07-11-1997 15-05-1998
US 5446891 A	29-08-1995	NONE	